WHAT IS CLAIMED IS:

1. An isolated polynucleotide encoding a polypeptide comprising the amino sequence essentially as set forth in SEQ ID NO: 2.

2. The isolated polynucleotide of claim 1, wherein said polynucleotide comprises the nucleic acid sequence essentially as set forth in SEQ ID NO:1.

3. The polynucleotide of claim 2, wherein said polynucleotide is operatively linked to a promoter.

4. The polynucleotide of claim 3, wherein said promoter is a tissue-specific promoter.

5. The polynucleotide of claim 2, further defined as a cDNA segment.

6. The polynucleotide of claim 2, wherein said polynucleotide is comprised in a vector.

7. The polynucleotide of claim 6, wherein said vector is selected from the group consisting of a retroviral vector, an adenoviral vector, and adeno-associated viral vector, a lentivirus vector, a vaccinia viral vector, and a herpesviral vector.

8. The polynucleotide of claim 1, further comprising a pharmaceutically acceptable formulation.

9. A recombinant host cell comprising a DNA segment encoding an isolated human choline transporter.

10. The recombinant host cell of claim 9, wherein said DNA segment encoding a polypeptide having the amino acid sequence essentially as set forth in SEQ ID NO:2.

11. The recombinant host cell of claim 9, wherein said cell is a human cell.

12. A recombinant vector comprising a DNA segment encoding a human choline transporter polypeptide under the control of a promoter.

13. The recombinant vector of claim 12, wherein said vector enhances cholinergic signaling.

14. A purified and isolated polynucleotide wherein the polynucleotide comprises a sequence identical or complementary to between 14 and 100 contiguous nucleotides of SEQ ID NO:1.

15. The polynucleotide of claim 14, wherein said polynucleotide comprises least 20 contiguous nucleotides of SEQ ID NO:1.

16. The polynucleotide of claim 14, wherein said polynucleotide comprises least 30 contiguous nucleotides of SEQ ID NO:1.

17. The polynucleotide of claim 16, wherein said polynucleotide comprises least 100 contiguous nucleotides of SEQ ID NO:1.

18. The polynucleotide of claim 14, wherein said polynucleotide is complementary to at least 20 contiguous nucleotides of SEQ ID NO:1.

19. The polynucleotide of claim 14, wherein said polynucleotide is complementary to at least 30 contiguous nucleotides of SEQ ID NO:1.

20. The polynucleotide of claim 19, wherein said polynucleotide is complementary to at least 50 contiguous nucleotides of SEQ ID NO:1.

21. A purified peptide comprising at least 10 contiguous amino acids of SEQ ID NO:2.

22. The peptide of claim 21, comprising at least 20 contiguous amino acids of SEQ ID NO:2.

23. The peptide of claim 21, comprising at least 50 contiguous amino acids of SEQ ID NO:2.

24. The peptide of claim 21, wherein said peptide is sensitive to hemicholinium-3.

25. The peptide of claim 21, wherein said wherein said peptide is mutated relative to the wild-type hCHT protein.

26. The peptide of claim 25, wherein said peptide modulates high-affinity choline uptake.

27. The peptide of claim 21, wherein said peptide binds to an antibody specific to the polypeptide comprising at least 10 contiguous amino acids of SEQ ID NO:2 encoded by human cDNA.

28. A method of using a DNA segment that encodes an isolated human choline transporter protein, comprising the steps of:

(a) preparing a recombinant vector in which a human choline transporter encoding said DNA segment is positioned under the control of a promoter;

(b) introducing said recombinant vector into a host cell;

(c) culturing said host cell under conditions effective to allow expression of the encoded protein or peptide; and

(d) collecting said expressed protein or peptide.

29. An isolated polynucleotide encoding a polypeptide comprising the amino sequence essentially as set forth in SEQ ID NO: 4.

30. The isolated polynucleotide of claim 29, wherein said polynucleotide comprises the nucleic acid sequence essentially as set forth in SEQ ID NO:3.

31. The polynucleotide of claim 30, wherein said polynucleotide is operatively linked to a promoter.

32. The polynucleotide of claim 30, further defined as a cDNA segment.

33. The polynucleotide of claim 30, wherein said polynucleotide is comprised in a vector.

34. A recombinant host cell comprising a DNA segment encoding an isolated choline transporter having the amino acid sequence essentially as set forth in SEQ ID NO:4.

35. A recombinant vector comprising a DNA segment encoding a mouse choline transporter polypeptide under the control of a promoter.

36. A purified and isolated polynucleotide wherein the polynucleotide comprises a sequence identical or complementary to between 10 and 100 contiguous nucleotides of SEQ ID NO:3.

37. A purified peptide comprising at least 10 contiguous amino acids of SEQ ID NO:4.

38. The peptide of claim 37, wherein said peptide binds to an antibody specific to the polypeptide comprising at least 10 contiguous amino acids of SEQ ID NO:4 encoded by mouse cDNA.

39. An antibody that immunologically binds to a protein or peptide encoded by a contiguous sequence from the nucleic acid sequence essentially as set forth in SEQ ID NO:1.

40. An antibody that immunologically binds to a CHT protein or peptide that includes a contiguous amino acid sequence from SEQ ID NO:2.

41. The antibody of claim 40, wherein said antibody is a polyclonal antibody.

42. The antibody of claim 40, wherein said antibody is a monoclonal antibody.

43. The antibody of claim 42, wherein said antibody is operatively attached to a therapeutic agent.

44. The antibody of claim 42, wherein said antibody is operatively attached to a detectable label.

45. The antibody of claim 44, wherein said label is selected from the group consisting of a fluorescent label, a chemiluminescent label, a electroluminescent label, a radiolabel and an enzyme.

46. The antibody of claim 45, wherein said label is a green fluorescent protein.

47. The antibody of claim 45, wherein said label is a β-galactosidase.

48. The antibody of claim 40, wherein said antibody is adapted to detect losses in cholenergic neurons.

49. A method of screening for cholinergic therapeutics comprising:

(a) obtaining a candidate substance;

(b) obtaining a recombinant cell comprising a polynucleotide encoding a choline transporter (CHT) polypeptide and a promoter heterologous to the polypeptide coding region, wherein said promoter directs expression of said CHT polypeptide;

(c) combining candidate substance with said cell; and

(d) determining whether said candidate substance modulates high-affinity choline uptake.

50. The method of claim 49, wherein said CHT is a human choline transporter (hCHT).

51. The method of claim 49, wherein said CHT is a mouse choline transporter (mCHT).

52. The method of claim 49, wherein said cell is a human cell.

53. The method of claim 49, wherein said cell is a mouse cell.

54. The method of claim 49, wherein said cell is an invertebrate cell.

55. The method of claim 49, wherein said cell and said candidate substance are combined *in vitro*.

56. The method of claim 49, wherein said cell and said candidate substance are combined *in vivo*.

57. The method of claim 49, wherein said candidate substance is an acetylcholine receptor therapeutic.

58. The method of claim 49, wherein said candidate substance is selected from a small molecule library.

59. The method of claim 49, wherein said candidate substance is an antibody.

60. The method of claim 59, wherein said antibody comprises SEQ ID NO: 25

61. The method of claim 49, wherein said candidate substance is a gene probe

62. The method of claim 49, wherein said candidate substance has low affinity against hCHT.

63. The method of claim 49, wherein determining comprises detecting a label operatively attached to said polypeptide.

64. The method of claim 63, wherein said detectable label is hemicholinium-3.

65. The method of claim 49, wherein said determining comprises Western Blot analysis.

66. The method of claim 49, wherein said determining comprises using a choline transport assay.

67. The method of claim 66, wherein said choline transport assay is a [^{3}H] choline transport assay.

68. The method of claim 66, wherein said choline transport assay further comprises COS-7 cells.

69. The method of claim 49, wherein determining comprises using *in situ* hybridization, PCR or gene chip analysis.

70. The method of claim 49, wherein determining comprises using a negative screen.

71. The method of claim 49, further comprising using said candidate substance to screen specificity for acetylcholine receptor-directed agents.

72. The method of claim 71, wherein said acetylcholine receptor-directed agents are nicotinic or muscarinic acetylcholine receptor-directed agents.

73. The method of claim 49, further comprising mapping mutations to the hCHT gene.

74. The method of claim 49, further comprising quantitatively evaluating cholinergic gene expression.

75. The method of claim 49, further comprising using said candidate substance to probe human cholinergic neurons.

76. The method of claim 49, further comprising using said candidate substance to identify cholinergic neurons in a postmortem brain.

77. A method of treating a patient comprising:

(a) obtaining a candidate substance;

(b) obtaining a recombinant cell comprising a polynucleotide encoding a choline transporter (CHT) polypeptide and a promoter heterologous to the polypeptide coding region, wherein said promoter directs expression of said CHT polypeptide;

(c) combining candidate substance with said cell;

(d) determining whether said candidate substance modulates high-affinity choline uptake; and

(e) delivering said candidate substance in a therapeutic formulation to a patient.

78. The method of claim 77, further comprising using an antibody to aid in transport of said candidate substance.

79. The method of claim 78, wherein said antibody aids in transport of said candidate substance to the brain of said patient.

80. The method of claim 78, wherein said antibody comprises SEQ ID NO: 25.

81. The method of claim 78, further comprising a probe attached to said antibody.

82. The method of claim 77, further comprising treating a neuromuscular, autonomic or central nervous system disorder of said patient.

83. The method of claim 77, further comprising treating a disease in said patient wherein said disease is Parkinson's disease, Huntington's disease, Alzheimer's, schizophrenia, dysautonomia or myasthenia gravis.

84. The method of claim 77, wherein determining comprises using *in situ* hybridization, PCR or gene chip analysis.

85. The method of claim 77, wherein determining comprises using a negative screen.

86. The method of claim 77, wherein said cell is contacted *in vitro*.

87. The method of claim 77, wherein said cell is contacted *in vivo*.

88. A nucleic acid detection kit comprising, in suitable container means, an isolated human choline transporter nucleic acid segment and a detection reagent.

89. The nucleic acid detection kit of claim 88, wherein the detection reagent is a detectable label that is linked to said nucleic acid segment.

90. The nucleic acid detection kit of claim 88, wherein the detection reagent is hemicholinium-3.

91. The nucleic acid detection kit of claim 88, further comprising a gene chip.

92. The nucleic acid detection kit of claim 88, further comprising an antibody.

93. A transgenic mouse, wherein said mouse lacks at least one functional mouse choline transporter (mCHT) allele.

94. The mouse of claim 93, wherein said mouse lacks two functional mCHT alleles.

95. The mouse of claim 93, wherein said mouse lacks the gene essentially as set forth in SEQ ID NO: 3.

96. A transgenic mouse, wherein the genome of said mouse comprises a choline transporter (CHT) encoding a DNA segment under the control of a heterologous promoter.

97. The mouse of claim 96, wherein said mouse expresses more CHT polypeptides when compared to a non-transgenic littermate.

98. A transgenic mouse, wherein at least one mouse choline transporter (mCHT) allele is operably attacted to a detectable label.

99. The mouse of claim 98, wherein said label is selected from the group consisting of a fluorescent label, a chemiluminescent label, a electroluminescent label, a radiolabel and an enzyme.

100. The mouse of claim 99, wherein said label is a green fluorescent protein.

101. The mouse of claim 99, wherein said label is a β-galactosidase.

102. A method comprising the step of delivering a polynucleotide encoding a choline transporter (CHT) polypeptide to a cell.

103. The method of claim 102, wherein said CHT polypeptide comprising the amino sequence essentially as set forth in SEQ ID NO: 2.

104. The method of claim 102, wherein said method causes an increase in cholinergic function in said cell.

105. The method of claim 104, wherein said cell is in a patient having Parkinson's disease, Huntington's disease, Alzheimer's, schizophrenia, dysautonomia or myasthenia gravis.